

THE USE OF TOOLS BY BROWN-HEADED NUTHATCHES

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THE use of tools by individuals in natural populations has been recorded for only a few species of birds. Following Thorpe (1963), tool use here is considered as the manipulation of objects that serve as an extension of the bodily mechanism. Species of birds using tools include various species of Geospizinae (Lack, 1947; Eibl-Eibesfeldt and Sielmann, 1962; Hundley, 1963; Curio and Kramer, 1964), the Satin Bower-bird (*Ptilorhynchus violaceus*) (Marshall, 1954), Black-breasted Buzzard (*Hamirostra melanostrerna*) (Chisholm, 1954), and Indian Tailor-bird (*Orthotomus sutorius*) (Wood, 1935). The following observations of tool use in Brown-headed Nuthatches (*Sitta pusilla*) are of considerable interest because bark scales have not been reported as tools and tool-use behavior has not been reported from the Sittidae in nature. Observations were made in the extensive longleaf pine (*Pinus australis*) forests of western Tangipahoa Parish, Louisiana, in the fall and winter of 1963-64 and the fall of 1964.

OBSERVATIONS

Tool use occurred as follows: Brown-headed Nuthatches selected a readily available scale of bark (Fig. 1) from a pine trunk or large limb and used it as an extension of their beak to remove another bark scale from a trunk or large limb. They accomplished this feat by inserting the tool under the scale to be removed and then manipulating it in various directions, in the manner of a wedge and lever. Usually they were successful in removing the attached scale in the process. When the scale was removed the birds usually dropped the tools and both bits of bark fell to the ground. The bird then foraged upon the newly exposed surface, which before this moment formed an excellent hiding place for insects and other potential prey items. Occasionally, they would remove three or four scales before dropping the tool. A maximum of three tools were picked up during any sequence of this behavior that I observed. The process was obviously a random search rather than an attempt to obtain any single item of food. Upon occasions Brown-headed Nuthatches were observed carrying single scales of bark in their beaks and even flying short distances with them. These scales probably were to be used eventually as tools.

Tool use was noted principally outside the seasons of heavy seed crops. This behavior was uncommon, but was observed on several days in the 1963-64 and 1964-65 seasons when the birds were watched carefully for considerable periods of time (Table 1). Tool use was not noted during observations

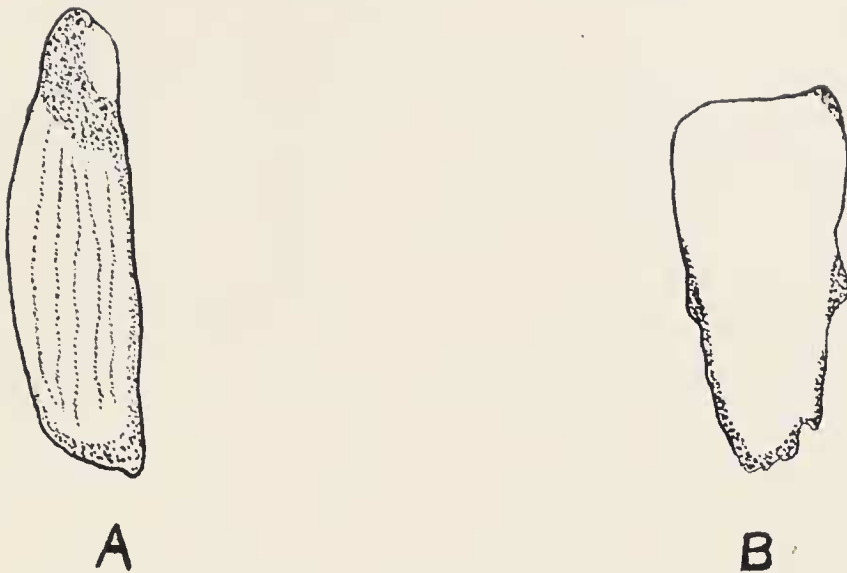


FIG. 1. A. Seed of longleaf pine $\times 1$. B. Small bark scale of longleaf pine used as tool $\times 1$.

of Brown-headed Nuthatches in loblolly pine (*Pinus taeda*) and spruce pine (*P. glabra*) forests 45 km away. The bark scales of these two species of pines do not readily separate from the trunk as do those of longleaf pines.

The use of tools may be confused easily with seed cracking, which in this species is accomplished by wedging a seed into a depression of the bark and hammering upon it with the bill. However, upon two occasions I retrieved the scales used as tools and those removed by using the tools. Both the tool and the scale removed usually were considerably larger than longleaf pine seeds, which are winged and suggestive of red maple (*Acer rubrum*) seeds in shape (Fig. 1).

DISCUSSION

Brown-headed Nuthatches feed extensively on pine seeds when available (Norris, 1958; Morse, 1967). These observations were made in the longleaf pine forests in which seed crops are extremely sporadic. Bumper crops occur approximately every five to seven years, total failures about as often, and smaller crops other years (Wahlenberg, 1946). Thus, the use of tools outside of a heavy seed season very probably improves the birds' efficiency in foraging during these periods.

Longleaf pine has extremely flaky bark, which can be removed with considerable facility by small birds. Many adequate tools (flakes of bark) are available, making these trunks ideal areas for potential tool use. Tool use apparently facilitates the removal of flaky bark scales, including ones that otherwise could only be removed with difficulty, if at all. Additional hiding places of invertebrates thus can be reached readily by their use. In

TABLE 1
TOOL USE BY BROWN-HEADED NUTHATCHES

Condition of seed crop	Observations of tool use	Hours of observations*	Frequency (times/hour)
Few seeds	10	150	0.066
Abundant seeds	1	75	0.013

* Based upon an average of one bird being watched continually during a study period.

other local species of pines, the bark is not flaky enough to facilitate its ready removal, either for a tool or by a tool.

Tool use in Brown-headed Nuthatches apparently is a local characteristic. Norris (1958) did not mention this behavior in his extensive study and literature review of this species; in fact, neither Norris nor Löhrl (1958) mentioned tool use in any of the Sittidae. Thus far, this behavior has been noted only in the Tangipahoa Parish study area, although longleaf pine forests extend over large parts of the southeastern United States. A tendency of Brown-headed Nuthatches to forage heavily in the foliage and small branches during the part of the season that they are largely insectivorous and to feed on pine seeds at other times (Morse, 1967) may limit the utility of developing this trait in other areas.

Tool use of the type described would be expected in Brown-headed Nuthatches more commonly than in other seed eaters of the forest. They are the only common species feeding heavily upon pine seeds that crack these seeds by wedging them into the bark. The other principal users of pine seeds in the longleaf pine forests, Carolina Chickadees (*Parus carolinensis*) and Tufted Titmice (*P. bicolor*), cracked seeds by holding them between their feet and hammering upon them. White-breasted Nuthatches (*Sitta carolinensis*) cracked seeds in a manner similar to that of Brown-headed Nuthatches, but were uncommon and did not feed heavily upon the seeds. Pine Warblers (*Dendroica pinus*) cracked pine seeds in a manner similar to the nuthatches, but did so much less frequently than did Brown-headed Nuthatches, were extremely inefficient at the activity, and probably were completely dependent upon a horizontal position for this activity (Morse, 1967).

In experimental studies, Herter (1940) reported that Eurasian Nuthatches (*Sitta europaea*) were completely unsuccessful in manipulating string to pull up food, although Mountfort (in Thorpe, 1963) reported that this species successfully performed this exercise. The ability to manipulate string in such a manner is more likely if a tendency to manipulate objects with the feet is present (see Thorpe, 1963) than if it is absent. Many titmice

(Paridae) normally manipulate food in this way, but such a tendency has not been reported authentically in the Sittidae (Norris, 1958). Members of this family manipulate food by wedging it into a crack of a solid object such as a tree trunk and then hammering upon it with their bill, the manipulation of food being performed by the bill alone. When cracking seeds or other objects in the bark of longleaf pines, Brown-headed Nuthatches probably sometimes slough off scales of the flaky bark. Following such an occurrence, food might become suddenly exposed. The process of wedging food into a crevice is very suggestive of the way in which a flake of bark is used for a wedge, and the large seeds of the longleaf pine even resemble a flake of bark somewhat. These similarities offer a possible explanation of the origin of tool use in this species. Also, the tendency to manipulate objects with the bill would likely make such a behavioral modification especially feasible.

SUMMARY

A local population of Brown-headed Nuthatches (*Sitta pusilla*) was discovered, whose individuals sometimes used flaky bark scales of longleaf pines (*Pinus australis*) for tools to pry other bits of bark off trunks and large limbs of those trees. This behavior may be of particular aid to them in foraging when the seed crop fails. Tool use in this species closely resembles the process of cracking seeds in the heavily ridged bark.

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NEW LIFE MEMBER



Mr. Ed N. Harrison, of Los Angeles, California has recently become a Life Member of the Wilson Ornithological Society. Mr. Harrison, who is Manager of the Westwood Center office building in Los Angeles, has had a distinguished career as an amateur ornithologist. He is a longtime member and a Past President of The Cooper Society; is currently President of The Western Foundation of Vertebrate Zoology; and is a member of the boards of both the Los Angeles County Museum and the San Diego Museum of Natural History. His principal ornithological interests have been in studying the birds of Central America, and in assembling a library of animal and birdlife. Some years ago he produced a nature film, "Song of the Land" which was nominated for an academy award. Mr. Harrison is married and has three children.